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$$=\tfrac{1}{15}\left(a+b+c+(a+b)\frac{(a-b)^2}{c^2}+(a+c)\frac{(a-c)^2}{b^2}+(b+c)\frac{(b-c)^2}{a^2}\right)$$

$$+\tfrac{4}{15}\,\triangle^2\left[\frac{1}{c^3}\log\left(\frac{s}{s-c}\right)+\frac{1}{b^3}\log\left(\frac{s}{s-b}\right)+\frac{1}{a^3}\log\left(\frac{s}{s-a}\right)\right].$$

In the above free use is made of the well known formulas

$$\sin A=\frac{2\triangle}{bc},\quad \cos A=\frac{b^2+c^2-a^2}{bc},\quad \tan\tfrac{1}{2}A=\sqrt{\frac{(s-b)\,(s-c)}{s(s-a)}},\text{ etc.}$$

*If $c=b=a$, $M_1=\dfrac{a}{4\log 3}=.2276a$, and $M_2=\tfrac{1}{5}+\tfrac{4}{5}\dfrac{\triangle^2}{a^3}\log 3=\dfrac{a}{5}(1+\tfrac{3}{4}\log 3)$ $=.3638a$.

CALCULUS.

Note on Problem 207.—The proposer's value of $\frac{1}{4}\pi^2$ for the definite integral $\int_0^1\frac{Kd_\kappa}{1+\kappa}$ is wrong and should be $\frac{1}{8}\pi^2$. Mr. Corey's solution (p. 230) is correct except in the last line where the evaluation of $u-v=2\int_0^1\frac{\log(1+z)}{z}dz-\int_0^1\frac{\log(1+z^2)}{z}$ should read $2\frac{\pi^2}{12}-\frac{1}{2}\frac{\pi^2}{12}=\frac{\pi^2}{8}$. That this is true is easily shown by the following evaluation, due to Dr. Zerr, who has contributed two correct solutions of the problem.

$$u-v=2\int_0^1(1-\tfrac{1}{2}z+\tfrac{1}{3}z^2-\tfrac{1}{4}z^3+\dots\dots)dz-\int_0^1(z-\tfrac{1}{2}z^3+\tfrac{1}{3}z^5-\tfrac{1}{4}z^7+\dots\dots)dz$$

$$=2(1-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\dots\dots)-\tfrac{1}{2}(1-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\dots\dots)$$

$$=-\tfrac{3}{2}(\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\dots\dots-\frac{2}{1^2}-\frac{2}{3^2}-\frac{2}{5^2}-\dots\dots)\dagger=-\tfrac{3}{2}(\frac{\pi^2}{6}-\frac{\pi^2}{4})=\frac{\pi^2}{8}.$$

G.

210. Proposed by **EDWIN L. RICH**, Schenectady, New York.

Determine a polynomial, $f(x)$, entirely in x and of the seventh degree, so that $f(x)+1$ is divisible by $(x-1)^4$ and $f(x)-1$ by $(x+1)^4$. [Goursat-Hedrick, *A Course in Mathematical Analysis*, p. 32, Ex. 3.]

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*See Problem 35, p. 391, Williamson's *Integral Calculus*.

†See for example, Locke's *Treatise on Higher Trigonometry*, p. 99 and Ex. 1, p. 100.